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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,805	10/26/2005	Raynald Labrecque	0055676-000013	4174

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EXAMINER	
TAI, XIUYU	

ART UNIT	PAPER NUMBER
1759	

NOTIFICATION DATE	DELIVERY MODE
02/17/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/533,805	LABRECQUE ET AL.	
	Examiner	Art Unit	
	Xiuyu Tai	1759	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) *See Continuation Sheet* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *96,98,103,107,109,110,113,114,118,121,123-126,132,191 and 192* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 96, 98-103, 105- 107, 109, 110,113, 114, 118. 119, 121, 123-133, 136-140, 142-162, 168-192 .
Continuation of Disposition of Claims: Claims withdrawn from consideration are 99-102,105,106,127-131,133,136-140,142-162 and 168-190.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/19/2010 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claim96-98,103-104, 107-126, and 191-192 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment.

3. In response to the arguments regarding specific surface and the reference of Maskalick (see page 24-26 of REMARKS), it should be noted that (i) the claim does not require the specific surface of the lining and (ii) the reference of Maskalick is cited as an evidence, showing that steel wool mainly contains carbon steel; it is not cited for teaching of specific surface. Therefore, the argument regarding the specific surface of the lining is not relevant.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 96, 98, 103, 107, 109, 110, 113, 114, 118, 121, 123-125, 132, 191, and 192 are rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) in view of Taguchi et al (U.S. 6,972,119), and further in view of Takahashi (U.S. 5,746,985).

7. Regarding claim 96, ABE et al disclose a reformer having an electrically heatable heater unit (ABSTRACT). The reformer comprises:

(1) a metallic casing 13 (i.e. an enclosure);

(2) the interior of the casing 13 (i.e. a reaction chamber) for encompassing a heater units 10/111 and a catalyst unit 12/17 (Figure 2; paragraph [0063]),

wherein (i) each heater unit has electrodes 14 (Figure 2; paragraph [0063]);

(ii) the catalyst unit 12 may contain metal (i.e. conductive lining material, paragraph [0082] & [0083]) in the form of porous honeycomb structure (Figure 2; paragraph [0090]);

(iii) the catalyst unit 12 is not in contact with the casing 13 (Figure2) and contains ceramic honeycomb carrier (paragraph [0090]), inherently being insulated from the metallic wall of the casing 13; and

(iv) the catalyst metal may be element of group VIII (paragraph [0082]).

(3) a reactant fluid inlet 15 (i.e. one gas to be reformed supply duct, Figure 2; paragraph [0063]), wherein the reactant fluid contains an organic hydrocarbon compounds (paragraph [0074]);

(4) an outlet 16 (i.e. one reformed gas outlet, Figure 1; paragraph [0063]); and

(5) an external electric source to supply electricity to the electrodes (Figure 2; paragraph [0063]).

ABE teaches that a steam reforming hydrogen-carbon may take place in presence of water steam (i.e. an oxidizing gas supply, paragraph [0075]), but does not specifically teach how the water steam is introduced into the casing. However, Taguchi et al disclose a hydrogen producing apparatus by reforming hydrogen-carbon compounds (ABSTRACT). The apparatus comprises a feedstock supply section 13 (i.e. one gas to be reformed supply duct) for a starting material and a water supply section 15 for a water steam (i.e. one oxidizing gas supply duct that is distinct from the gas to be reformed supply duct, Figure 1, col. 6, line 1-3) to complete steam-reforming of the feedstock. Therefore, it would be obvious for one having ordinary skill in the art to include a water supply section that is different from the gas inlet as suggested by Taguchi in order to reform hydrogen-carbons within the device of ABE.

Moreover, ABE teaches that honeycomb carrier of catalyst may have various types (paragraph [0124]), but ABE does not specifically disclose the catalyst being in a form as claimed. However, Taguchi et al disclose a hydrogen producing apparatus (ABSTRACT). Taguchi teaches various shift catalysts (Examples 6-8) and suggests that

stainless steel/ceramic wool be used as a honeycomb-shaped carrier (col. 16, line 29-30). The teaching of Taguchi shows that honeycomb carrier with stainless steel/ceramic wool is an equivalent structure to the honeycomb structure with catalyst for reforming hydrocarbons. Because two honeycomb carriers are art-recognized equivalent, one having ordinary skill in the art would have found it obvious to substitute honeycomb carrier of ABE with stainless steel wool honeycomb carrier of Taguchi.

Furthermore, ABE teaches that the heater unit with electrodes may be obtained by loading the catalyst on the honey comb structure having electrical heat-ability (paragraph [0093]), but ABE/Taguchi does not teach an electronic flux generated in the catalyst between the electrodes. However, Takahashi discloses a reforming reactor having a heating resistor embedded in a catalyst (ABSTRACT). Takahashi teaches a reforming reactor 15 having a honeycomb heating resistor 22 embedded upstream of a catalyst 10 (Figure 1 & 3; col. 3, line 65-67 & col. 5, line 13-16). Takahashi also indicates that a honeycomb structured heating resistor embedded in a catalyst results in excellent heat transmission and fast reforming reaction (col. 3, line 3-9). Therefore, it would be obvious for one having ordinary skill in the art to embed the heating unit with electrodes in the catalyst unit of ABE as suggested by Takahashi in order to improve heat transmission, hence increasing reforming efficiency of ABE/Taguchi. As such, an electronic flux is generated in the catalyst between electrodes.

8. Regarding claim 98, ABE teaches that the casing 13 is in a shape of pipe (Figure 2).

9. Regarding claim 103, ABE teaches that the heater unit including electrodes may have honeycomb structure (paragraph [0093]) which has a cylindrical pipe (i.e. a tubular member) and opening holes on a plate surface (i.e. hollow perforated disk) as shown in Figure 20 while Takahashi teaches a reforming reactor 15 having a honeycomb heating resistor 22 embedded upstream of a catalyst 10 (i.e. disk in contact with the catalyst, Figure 1 & 3; col. 3, line 65-67 & col. 5, line 13-16) and a hydrocarbon reactants supplied to the reforming reactor from upstream of the heating resistor 22 (col. 4, line 13-15).

10. Regarding claim 107, iron of ABE is a conductive metal, which is inherent to have the claimed physical characteristics.

11. Regarding claim 109, ABE teaches that the catalyst unit 1 may be in the form of porous honeycomb structure (Figure 1; paragraph [0090]) and the honeycomb structure is shown in Figures 20 &21 which has perforated surfaces. With respect to the required openings, one having ordinary skill in the art would have realized to optimize the size of honeycomb structure in order to allow gas reactants/conversion products to pass through the catalyst unit without huge pressure drop.

12. Regarding claim 110, Taguchi suggests that stainless steel/ceramic wool be using as a honeycomb-shaped carrier (col. 16, line 29-30).

13. Regarding claim 113, Taguchi suggests stainless steel wools as a catalyst honeycomb carrier, but does not specifically disclose the size of the stainless steel wool. One having ordinary skill in the art would have realized to optimize the fiber size,

pore size/porosity of the fiber in order to achieve greater surface area, hence efficiently reforming the reactants.

14. Regarding claims 114 and 119, ABE teaches that the catalyst unit 11 may be in the form of porous honeycomb structure (Figure 2; paragraph [0090]), but does not specifically disclose the claimed surface area and porosity index. However, one having ordinary skill in the art would have realized to optimize the opening size of honeycomb structure in order to allow reactants/ products to pass through the catalyst unit without huge pressure drop.

15. Regarding claim 118, it is well known in the art that a transformer is used to energize electrodes for supplying electric power. With respect to the cited equation, it represents optimization of the power consumption based on process-limiting parameters, such as the geometry of the reactor, the type of lining material, the operating conditions, and gas to be reformed. The process limiting parameters do not differentiate the claimed structure from the reformer of ABE (see MPEP 2114). Furthermore, one having ordinary skill in the art would have been obvious to optimize power consumption in order to efficiently reform reactant gases with minimum power consumption.

16. Regarding claim 121, ABE teaches that the honeycomb structured catalyst unit 1 is made of Fe and other particles (paragraph [0102]) while Taguchi suggests that stainless steel/ceramic wool be using as a honeycomb-shaped carrier (col. 16, line 29-30). Regarding claim 123, ABE teaches that the heater unit may have honeycomb structure which has opening holes (i.e. hollow perforated disk) as shown in Figure 20

(paragraph [0104]). One having ordinary skill in the art would have realized to optimize the size of openings of ABE (hence the density of the openings) in order to allow reactants/ products to pass through electrodes without huge pressure drop.

17. Regarding claim 124, one having ordinary skill in the art would have realized to optimize the size of openings of ABE (hence the density of the openings) in order to allow gas reactants/conversion products to pass through electrodes without huge pressure drop.

18. Regarding claim 125, the openings of ABE are uniformly distributed on the electrodes (Figure 20).

19. Regarding claim 132, it has been held that a device having claimed relative dimension would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (see M.P.E.P. 2144).

20. Regarding claim 191, the catalyst may contain iron (paragraph [0083]).

21. Regarding claim 192, it is known in the art that the steel wool is basically a low carbon steel as is evident by the teaching of Maskalick (col. 3, line 46-47).

22. Claims 126 is rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741), Taguchi et al (U.S. 6,972,119), and Takahashi (U.S. 5,746,985) as applied to claim 23 above, and further in view of Hoecker (U.S. 6,615,588).

23. Regarding claim 126, ABE/Taguchi/Takahashi fails to teach the opening size of perforated plated being variable. However, Hoecker disclose an arrangement for using a plate shaped element with through openings for cooling a component. Hoecker

teaches that the opening of the through openings 4 increase in the flow direction in proportion to the distance traversed of the cooling duct 5 (Figure 3; col. 5, line 44-46) in order to achieve uniform cooling effect in air flow (col. 2, line 51-56). Therefore, it would be obvious for one having ordinary skill in the art to utilize the arrangement of variable opening size along the perforated plate as suggested by Heocker in the device of ABE/Takahashi in order to achieve uniform gas distribution along the electrode plate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./
Examiner, Art Unit 1759

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1723